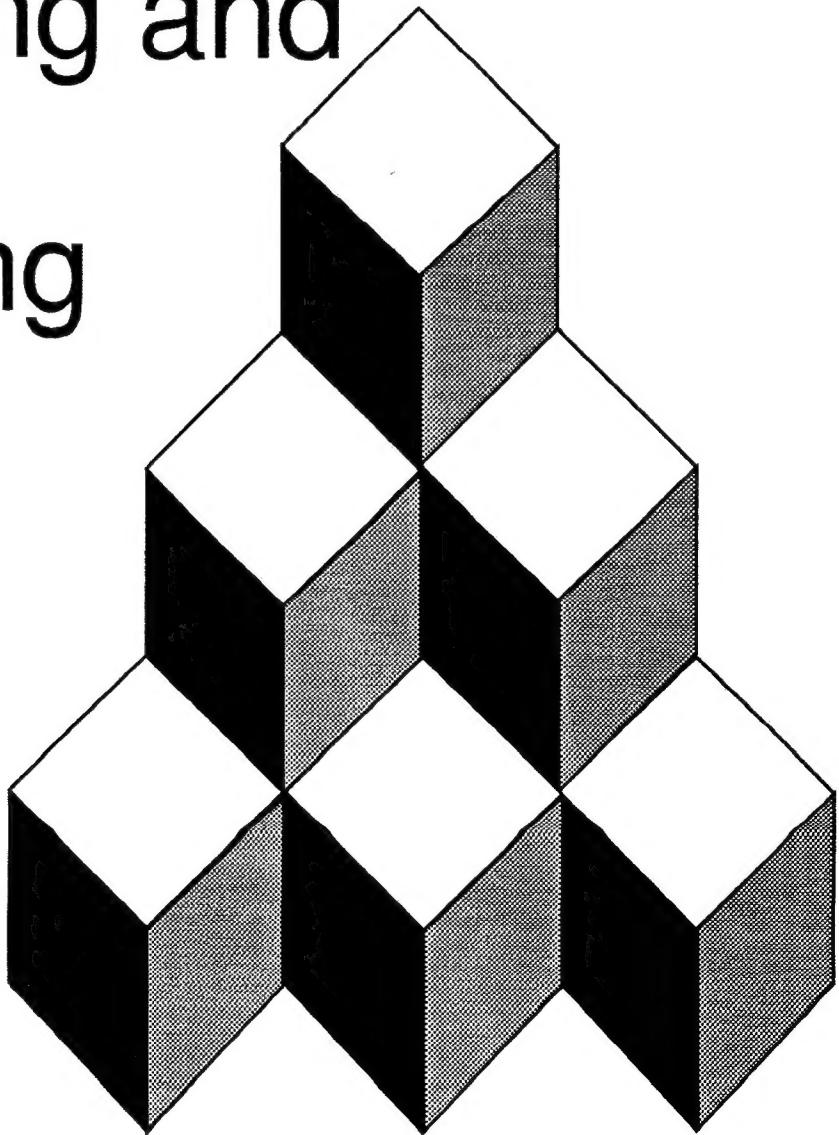


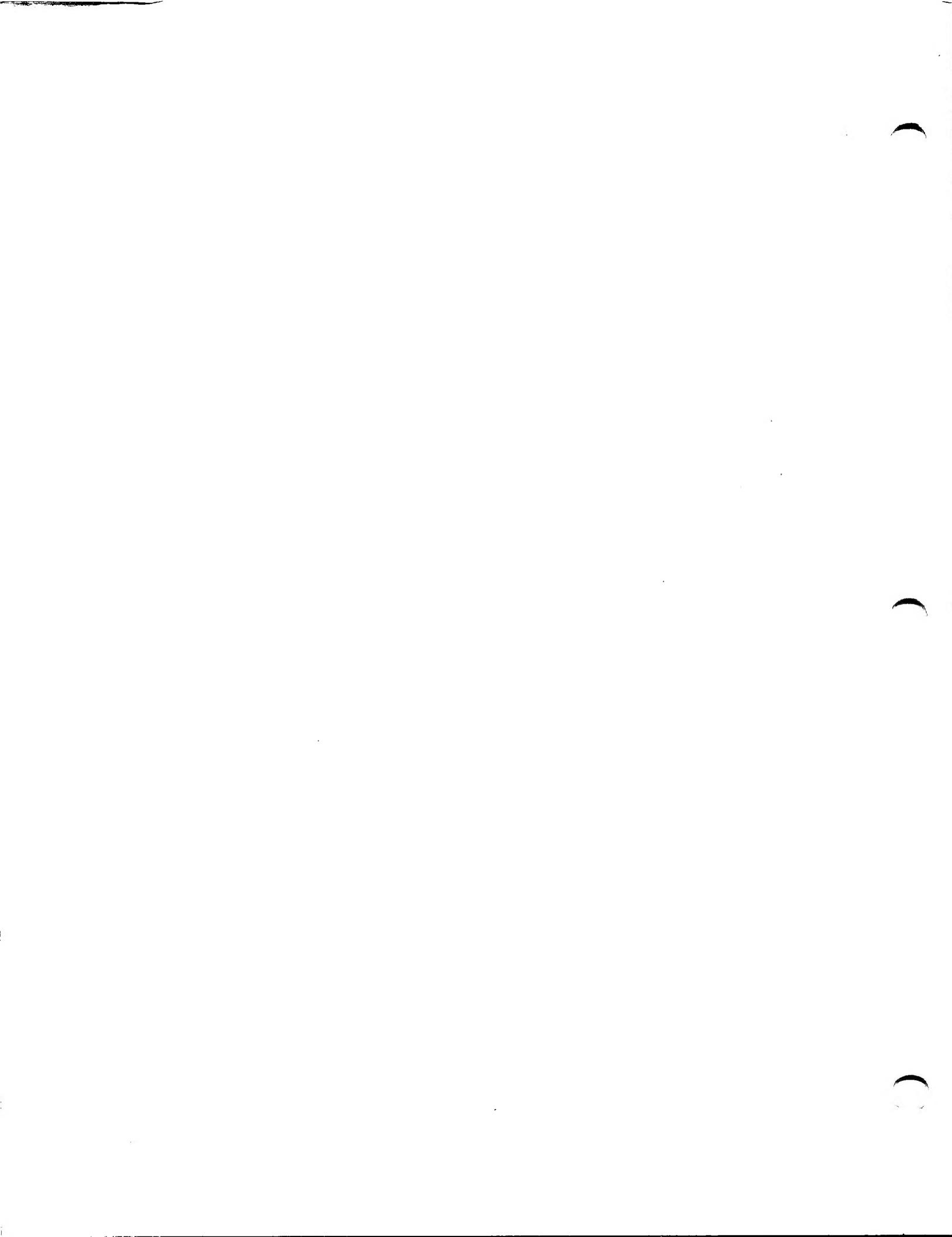
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Grover Beach, CA 93433

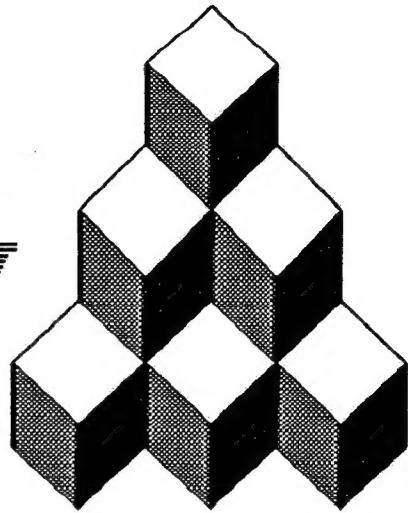
(800) 336-1022

Tools for Active Teaching and Active Learning





Geometry Concepts



For Apple // Series Computers

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Geometry Concepts

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Introduction

Geometry Concepts is an interactive learning system that has been designed to provide 7th grade enrichment through adult level instruction in mathematics. Several approaches to geometry instruction are combined in the design of this educational software package. The complete Apple // series version of Geometry Concepts is provided on one 5.25" or 3.5" diskette. The Geometry Concepts program contains the Identification Game, the Data Retrieval Utility, the Quiz Machine for each topic and the Constructions Demonstration.

With the Geometry Concepts program each topic can be studied using an Identification Game where the object is to identify a term or key concept, a Data Retrieval Utility where terms and descriptions are accessed, or a Quiz Machine where practice matching terms and key concepts is provided. With the Identification Game students practice recognizing basic geometric concepts using diagrams and symbolic notation as clues. It can be used as a 'discovery learning' type of activity for students who are unfamiliar with the geometric terms or can be used for reinforcement after classroom instruction has been completed. The Data Retrieval Utility is a computerized reference system that allows students to review terms and concepts and to read detailed descriptions that explain the geometric significance of a term or concept. The Quiz Machine presents a term and asks the student to select the key concepts associated with that term.

The main instructional goals of Geometry Concepts are given in these educational objectives:

1. To provide practice identifying and matching basic geometry terminology. This computer based instruction unit graphically represents terms and key concepts and motivates students to learn the term or key concept which is graphically represented.
2. To incrementally build an understanding of fundamental concepts by providing an easy-to-use format for exploring geometry.
3. To support the development of a student's sense of confidence in his/her mathematical ability by measuring and reporting the student's progress toward understanding the topics presented in each unit using points and a percentage correct rating.

Geometry Concepts

The main topics covered by this learning system are listed below:

- Basic Concepts**
- Circles**
- Triangles and Angles**
- Lines and Planes**
- Area and Perimeter**
- Planar Figures**
- Solid Figures**

Geometry Concepts can be used in combination with other instructional approaches and closely parallels the geometry curriculum taught in most secondary schools. The program provides students with the opportunity to review and explore the concepts learned in mathematics classes. The format of the system is designed to make learning fun. The lessons for each topic present the material in a step-by-step, self-paced manner. Each topic can be studied in a variety of ways. A quiz for each topic assesses the student's mastery of the material and helps to provide reinforcement.

Geometry Concepts is useful as a supplement for most introductory level geometry students. Much of the confusion that students feel in geometry is due to an inability to understand the terminology used to describe geometric figures and relationships. Geometry Concepts is an effective tool for mastering the 'vocabulary of geometry'.

With Geometry Concepts, students enjoy learning the ideas that are essential for success in higher level math courses. The program is an effective way to introduce students to geometric terms and concepts and can also be used as a tool to provide reinforcement.

Supplementary materials are provided in this manual and are designed to be used in conjunction with the computer activities. The supplementary worksheets may be duplicated for classroom use. Lab packs with multiple copies of the program disks and network versions are available from the publisher.

Teacher's Guide

Credits

Software Design

Ventura Educational Systems

**Instructional Technology
and Programming**

Fred Ventura, Ph.D.

Editor

Marne Ventura, M.A.

Dr. Fred Ventura is an experienced classroom teacher and has taught elementary, secondary and college levels. He holds a doctorate in education from the University of California, and presents workshops for educators on the instructional uses of microcomputers.

Marne Ventura is also an experienced classroom teacher and holds a masters degree in reading and language development from the University of California. As a seminar leader, Marne Ventura has assisted many teachers in learning about the educational opportunities that can be derived from the use of microcomputers in the classroom.

Ventura Educational Systems publications include:

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Coordinate Geometry
Geometry Concepts
SuperGraph

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Base Ten Blocks
Hands-On Math Series

Science Grades 7 - 12

Anatomy of a Fish
Anatomy of a Shark
Chemaid
The Earthworm
The Fetal Pig
The Insect World
Life Cycle of a Sea Lamprey
Marine Invertebrates
Plant and Animal Cells
The Plant
Protozoa
Senses
VisiFrog

Math Grades 4 - 8

Beginning Geometry
GeoArt

Science Grades 4 - 8

All About Matter
All About the Solar System
All About Light & Sound
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Computer Concepts
Dr. Know

Other Subject Areas Grades 4-8

Music Concepts
States

Educational Kits Grades 7-12

Hands-On Electronics

Teacher Utilities

Clip-Art for Math Teachers
Clip-Art for Science Teachers
HyperCard Projects for Teachers

Additional Program Disks

Many schools have more than one computer and to effectively use educational software require additional legal copies of a program. Additional program disks are available for use in a computer lab. The price is \$10.00 per disk. Schools with a registered copy of any Ventura Educational Systems product may order additional copies of a program disk at any time. There is a 30 day warranty on original program disks. If for any reason a program disk becomes defective within 30 days of the date of purchase, Ventura Educational Systems will replace it at no charge.

Geometry Concepts

An Overview of the Geometry Concepts Learning System

Geometry Concepts combines a variety of instructional techniques in an easy-to-use learning system. First time users can opt to begin with the Identification Game and learn the terminology and related concepts in a 'discovery learning mode' or may decide to use the Data Retrieval Utility to scan the mathematics database. The Quiz Machine challenges the student to match the term and key concept. The program monitors student performance by displaying scores earned while using the Quiz Machine.

Text and graphics are interactively presented during the use of this program. Activity pages are provided in this manual and are designed to be used in conjunction with the use of the computer and as follow-up. Teachers are encouraged to duplicate the supplementary materials for classroom use.

In the quiz mode the computer's random number generating ability is employed to generate a unique mix of possible answers. The quiz can be set up so that students match terms with concepts or concepts with terms.

A Conceptual Framework for Geometry Concepts

Learning the terminology of geometry is an important goal because terminology is an essential element in building a foundation for mathematical knowledge. A strong foundation is necessary for success in the study of advanced mathematics where mathematical knowledge and skills are put to use in a variety ways.

The study of mathematics is most exciting when students are able to proceed at their own pace, taking time to explore concepts and experiment with the ideas that are being learned. The computer can be used to assist the learning process by providing a wealth of information and by providing a structure for experimentation.

The philosophical approach taken in the design of Geometry Concepts is to provide a computer based learning environment for studying terms and their related key concepts. For each topic the student has the opportunity to play an Identification Game, read information, or take a quiz. The results of the quiz are displayed on the screen at the completion of each quiz.

Teacher's Guide

The first topic is Basic Concepts. Here the student will learn about fundamental terms used throughout the study of geometry. The second topic is Circles and covers the parts of a circle and the terms that describe lines which pass through or touch circles. The third topic, Triangles and Angles, covers the terminology used to describe the size of angles and types of triangles. Lines and Planes is the fourth topic. The activities associated with this topic deal with the special relationships of intersecting lines and parallel lines cut by a transversal. The fifth topic is Area and Perimeter. Here students learn the formulas used to find the area and perimeter of common figures. In the sixth lesson on Planar Figures, students learn about special terms that apply to right triangles, rectangles and circles. In the last lesson, Solid Figures, students study the names and properties of common geometric solids as well as the formulas used to find volume.

Materials

The Geometry Concepts learning system includes these components:

Geometry Concepts Program Disk

Documentation: A Teacher's Guide
with Reproducible Black Line Masters

System Requirements

The minimum computer system configuration needed to use this program is given below:

Apple //+, Apple //c, Apple //e, or Apple //GS
Monochrome or Color Monitor
64K RAM and a Single Disk Drive

Getting Started

To start Geometry Concepts simply insert the program disk and turn on the computer. For the program to work correctly it is necessary for the system to boot from the Geometry Concepts program disk. After a few seconds the Activity Menu will appear.

Geometry Concepts

Activity Menu

The Activity Menu offers these choices:

**** Ventura Educational Systems ****
Geometry Concepts
An Introduction to the
Terminology of Geometry

- 1 --- Identification Game
- 2 --- Data Retrieval Utility
- 3 --- Quiz Machine
- 4 --- Constructions
- 5 --- Slide Show
- 6 --- Quit

Selection:

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To make a choice from this menu press the number corresponding to the choice. The main menu is followed by the topic menu.

Topics Menu

Geometry Concepts is organized around seven topics. Each of the seven topic areas can be studied in a variety of ways. The Topic Menu presents a list of topics. To select a topic move the indicator using the arrow keys to the desired topic and press return.

Geometry Concepts

- Basic Concepts
- Circles
- Triangles
- Lines & Planes
- Area & Perimeter
- Planar Figures
- Solid Figures

ARROWS OR RETURN

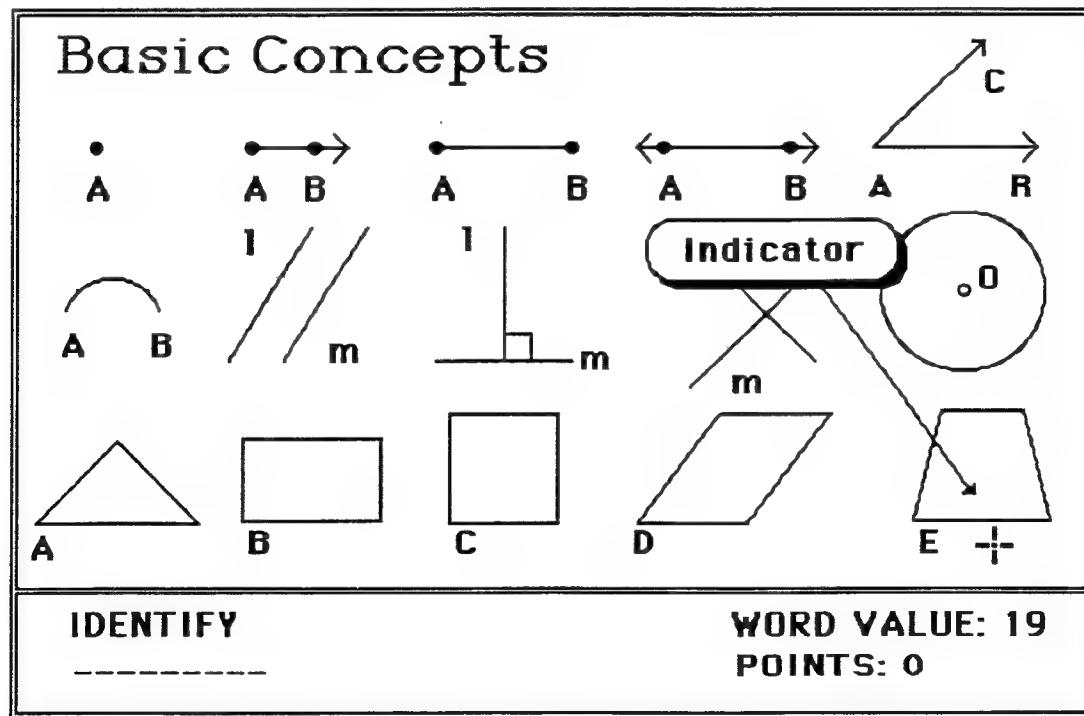
Instructions for Using the Identification Game

The Identification Game provides motivating practice in identifying terms and concepts that are represented in a geometric diagram. To study a particular topic select the topic from the Topic Menu.

When the Identification Game is selected from the Activities Menu a graphic screen for the current topic is presented. An indicator appears on the screen marking a part of the diagram. The indicator is used to provide a clue to a geometry term. The object of the game is to correctly identify the term.

In the example screen shown below the indicator is marking the trapezoid shown in the diagram. At the bottom of the screen a prompt consisting of blank lines shows the number of letters in the word. If the student playing the game does not know the term the best strategy is to guess letters. A letter can be played by typing the desired letter on the keyboard. Each incorrect letter played causes one point to be subtracted from the score, so guessing will not result in a very high score.

Sample Screen from the Identification Game



As correct letters are played the prompt line changes to show the position of the letters in the term. For example, in the term 'perpendicular lines', there are three places where the letter 'e' occurs. If the letter 'e' were played for this term, the letter would be filled in for all occurrences. The prompt would show the positions of

Geometry Concepts

the letter 'e' in the term 'perpendicular lines'.

Bonus points can be earned for entering a term correctly without guessing any letters. To select "Bonus" when the option is shown on the screen press the [/?] key. After the "Bonus" option has been selected the user is prompted to input the entire term. Enter the term using the keyboard and press the return key. If the term is entered correctly 10 bonus points are awarded. If the term is entered incorrectly the "Bonus" option is deactivated and the bonus opportunity is no longer available for this term.

The game is continued by identifying terms until all the terms for the selected topic have been entered. Press the Escape key to stop the Identification Game before completing all the terms.

Data Retrieval Utility

The Data Retrieval Utility gives access to the detailed information on the topic that has been selected from the Topic Menu. Topics cannot be changed during the use of the Data Retrieval Utility. In order to change topics the user must press the escape key to exit from the Data Retrieval Utility, select a different topic from the Topic Menu and then return to the Data Retrieval Utility.

The Data Retrieval Utility can be used in a variety of ways. It can be used to help students remember terms and key concepts, and is a useful way to study the terms and key concepts for a specific topic in preparation for using the Identification Game or the Quiz Machine.

The Data Retrieval Utility sequentially presents the terms and key concepts for the selected topic and provides the student with direct access to a more complete description of the geometrical significance of each term.

Triangles and Angles

$\angle ACB$

$\angle CDE = \angle BDF$

$\angle CDF = 180^\circ - \angle CDE$

$\triangle ABC$

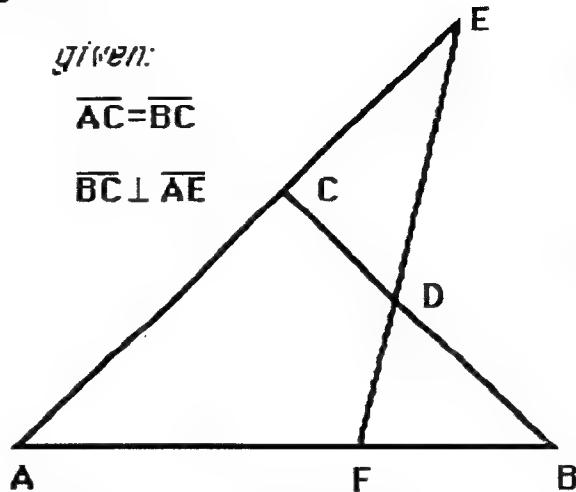
$\triangle AEF$

$\triangle BDF$

given:

$\overline{AC} = \overline{BC}$

$\overline{BC} \perp \overline{AE}$



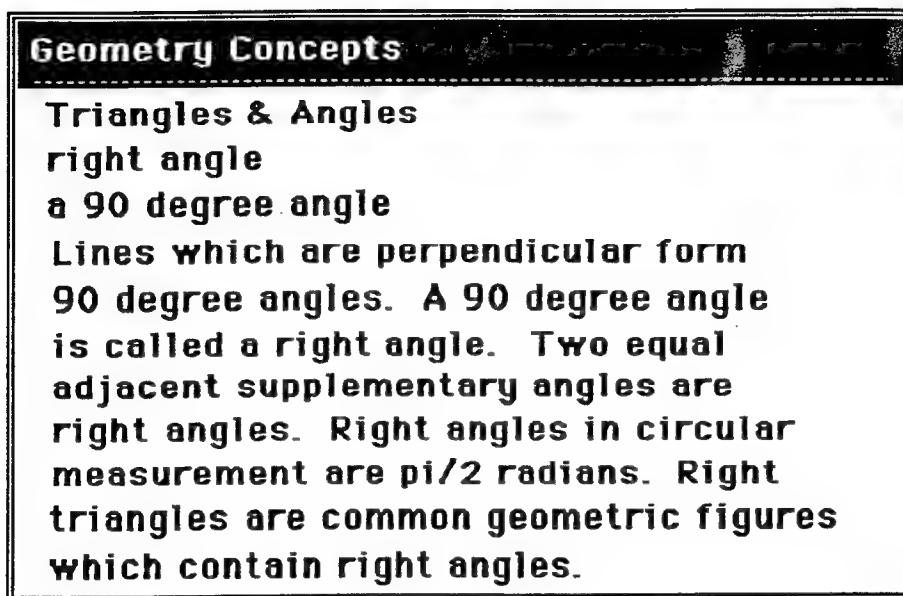
Triangles & Angles
right angle
a 90 degree angle

When the Data Retrieval Utility is selected a graphic screen is displayed. At the bottom of the screen the term and key concept are presented. The indicator on the screen marks a part of the graphic which illustrates the term or key concept that is shown in the lower part of the screen. Use the arrow keys to move the indicator to different parts of the graphic. To stop using the Data Retrieval Utility press escape.

Geometry Concepts

Accessing a Description

To read a description about the term and key concepts press the return key. Press the space bar to restore the graphic screen.



Quiz Machine

The Quiz Machine provides an opportunity to practice associating terms and key concepts. The program will randomly select and display a key concept and prompt the user to select the correct term to associate with the key concept. The terms used in the quiz are determined by the selection that has been made from the Topics Menu. Topics cannot be changed during the quiz.

To select a term use the arrow keys to move the indicator to the term and press the return key. Once an answer has been selected by pressing return it is immediately scored and the percent correct is shown. The program is motivating because students will see their percentage rating increase or decrease instantly after an answer is selected. The student can ask for help in answering a question by pressing the "H" key during the quiz to get clues to the answer before answering. Selecting help does not affect the percentage rating since the quiz is meant to be a learning experience.

Quiz: Basic Concepts

Match term with key concept:

trapezoid

- A. a portion of a line**
- B. one pair of parallel sides**
- C. right angle parallelogram**

Enter answer:

Press the escape key to stop using the Quiz Machine before reaching the last question for a specific topic.

Constructions

The Constructions option from the Activity Menu is a step-by-step guide to drawing five basic geometrical constructions. The process of drawing a construction is simulated by the computer and the student can follow the procedure using paper, a pencil, a ruler and a compass.

After selecting Constructions from the Activity Menu, the Constructions Screen is shown. Any of the five choices given in the list of constructions can be selected by using the arrow keys to change the construction and pressing the return key to begin the construction. Each time the return key is pressed the next step in the construction is given. The student should read the instruction and complete the step on paper, then press the return key or space bar to see the computer simulation of the construction. The construction is continued by pressing the return key to advance to the next step. The student is to follow the instructions given by drawing the construction on paper. After the construction is completed the Construction Menu is given again. To stop a construction before it is completed press the escape key.

Geometry Concepts

These five constructions are demonstrated:

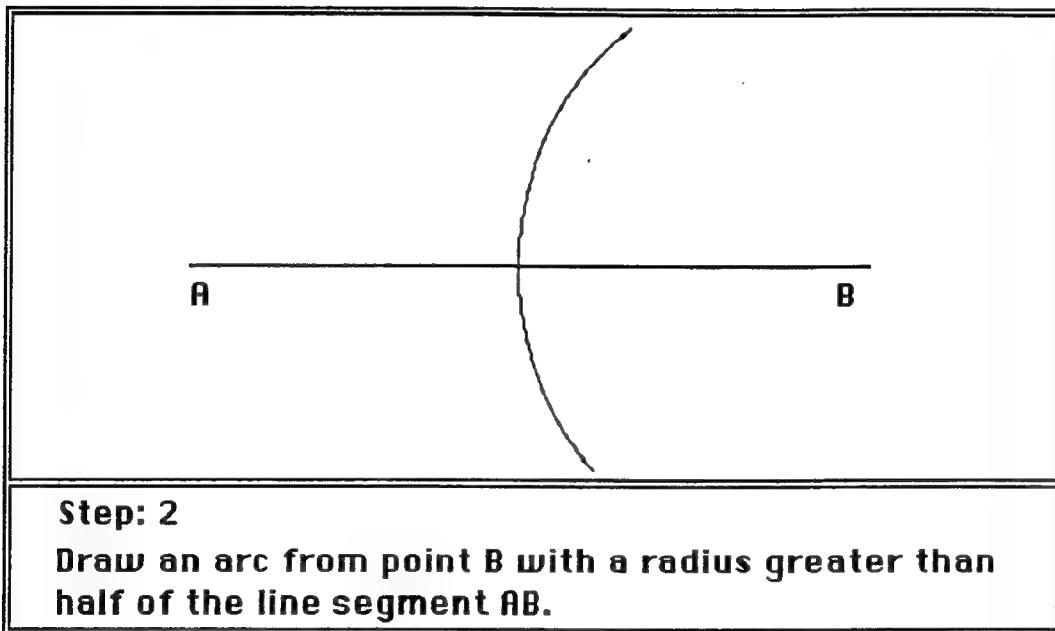
Perpendicular bisector of a line segment

Bisect an angle

Perpendicular line - point not on line

Perpendicular line - point on line

Inscribe a square

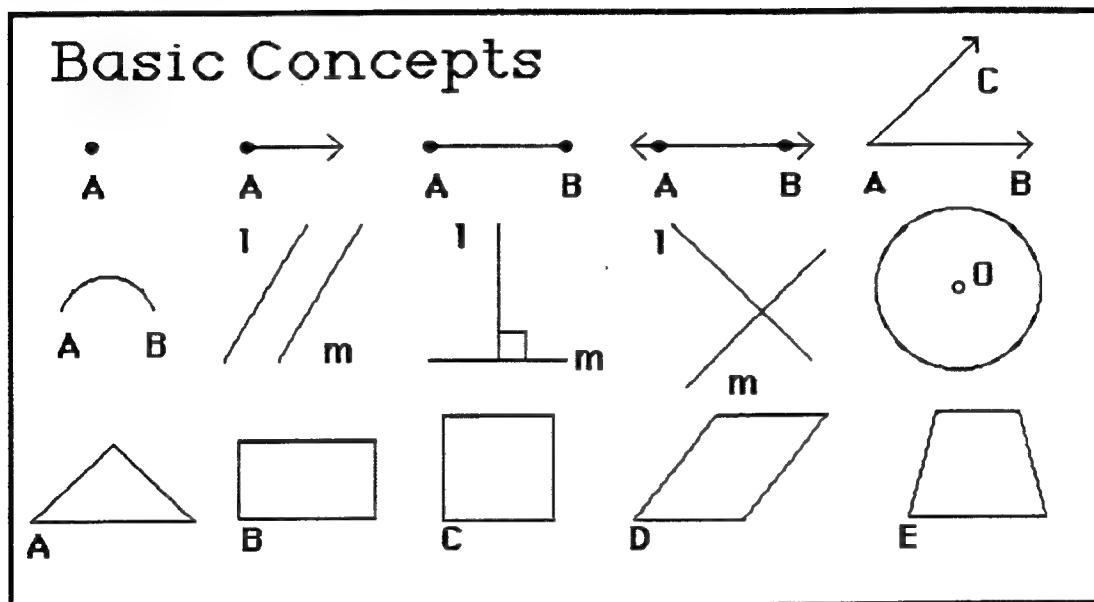


Supplementary Materials

Reproducible black-line masters are provided for classroom use. Each worksheet is designed to be used in conjunction with a particular topic. The worksheets provide directions for the student and can be used along with the use of the computer or as a follow-up to a computer activity.

Activity #1**Basic Concepts**

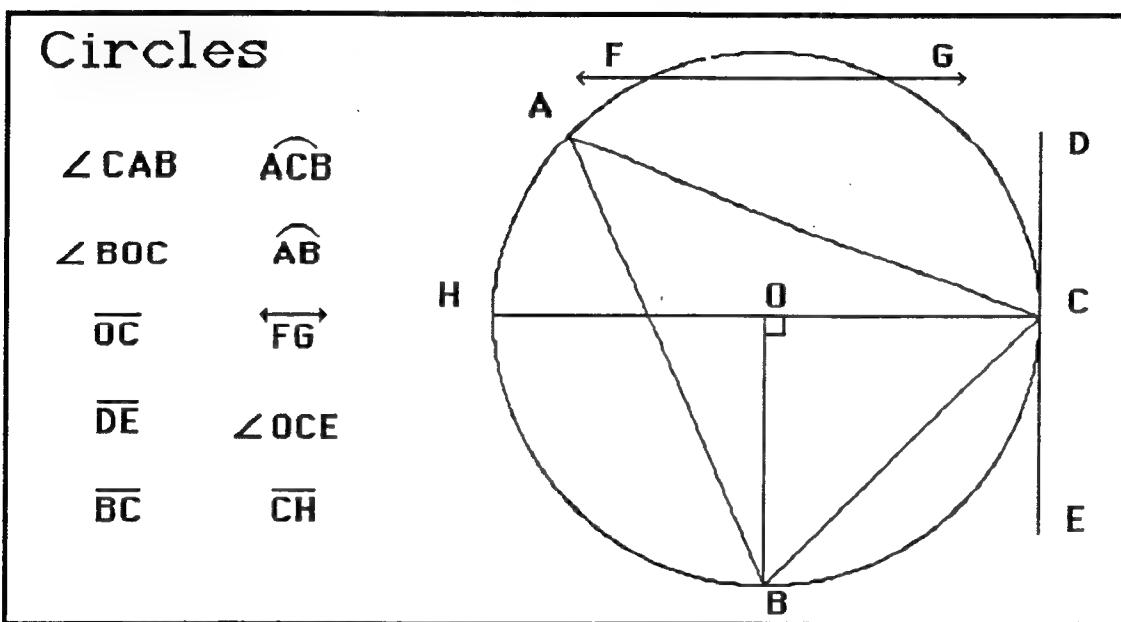
Complete this activity using the Data Retrieval Utility. Select Basic Concepts from the Topics Menu and study the terms represented in this diagram. In the spaces below write the names of the 15 geometric terms represented in this diagram. Label the diagram by placing the corresponding letter on the figure in the diagram.

**Terms:**

- A. _____ B. _____
C. _____ D. _____
E. _____ F. _____
G. _____ H. _____
I. _____ J. _____
K. _____ L. _____
M. _____ N. _____
O. _____

Activity #2**Circles**

Complete this activity using the Data Retrieval Utility. Select Circles from the Topics Menu and study the terms represented in this diagram. In the spaces below write the names of the 10 geometric terms represented in this diagram. Label the diagram by placing the corresponding letter on the figure in the diagram.

**Terms:**

A. _____

B. _____

C. _____

D. _____

E. _____

F. _____

G. _____

H. _____

I. _____

J. _____

Activity #3**Triangles and Angles**

Complete this activity using the Data Retrieval Utility. Select Triangles and Angles from the Topics Menu and study the terms represented in this diagram. In the spaces below write the names of the 7 geometric terms represented in this diagram. Label the diagram by placing the corresponding letter on the figure in the diagram.

Triangles and Angles

Given:
 $\overline{AC} = \overline{BC}$
 $\overline{BC} \perp \overline{AE}$

$\angle ACB$
 $\angle CDE = \angle FDB$
 $\angle FDC = 180^\circ - \angle CDE$
 $\triangle ABC$
 $\triangle AEF$
 $\triangle BDF$
 \overline{AB}

Terms:

- A. _____ B. _____
- C. _____ D. _____
- E. _____ F. _____
- G. _____

Activity #4**Lines and Planes**

Complete this activity using the Data Retrieval Utility. Select Lines and Planes from the Topics Menu and study the terms represented in this diagram. In the spaces below write the names of the 12 geometric terms represented in this diagram. Label the diagram by placing the corresponding letter on the figure in the diagram.

Lines and Planes

Identify the relationships between these lines:

| | | | |
|-------------------|-------------------|-------------------|-------------------|
| \leftrightarrow | \leftrightarrow | \leftrightarrow | \leftrightarrow |
| ef | bc | ab | ae |
| \leftrightarrow | \leftrightarrow | \leftrightarrow | \leftrightarrow |
| hg | dc | be | |

Identify the relationships of angles formed by a transversal:

| | | | |
|----------------------|----------------------|----------------------|--|
| $\angle 2, \angle 7$ | $\angle 5, \angle 4$ | $\angle 5, \angle 7$ | |
| $\angle 1, \angle 6$ | $\angle 2, \angle 6$ | $\angle 4, \angle 8$ | |

Terms:

A. _____

B. _____

C. _____

D. _____

E. _____

F. _____

G. _____

H. _____

I. _____

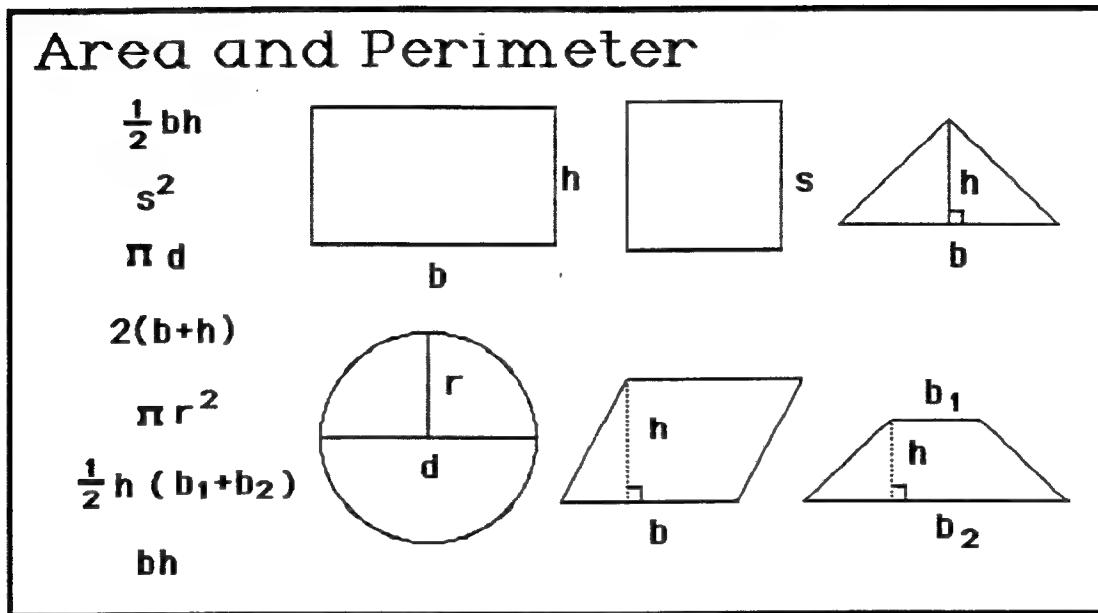
J. _____

K. _____

L. _____

Activity #5**Area and Perimeter**

Complete this activity using the Data Retrieval Utility. Select Area and Perimeter from the Topics Menu and study the terms represented in this diagram. In the spaces below write the names of the 7 geometric terms represented in this diagram. Label the diagram by placing the corresponding letter on the figure in the diagram.



Terms:

A. _____

B. _____

C. _____

D. _____

E. _____

F. _____

G. _____

Activity #6**Planar Figures**

Complete this activity using the Data Retrieval Utility. Select Planar Figures from the Topics Menu and study the terms represented in this diagram. In the spaces below write the names of the 8 geometric terms represented in this diagram. Label the diagram by placing the corresponding letter on the figure in the diagram.

Planar Figures

| |
|------------------------------------|
| \overline{BC} in $\triangle BDC$ |
| \overline{EF} in $\square AECF$ |
| \overline{AC} in $\odot O$ |
| \overline{OC} in $\odot O$ |
| \overline{BD} in $\triangle ABC$ |
| \overline{AC} in $\triangle ABC$ |
| \overline{CF} in $\square AECF$ |
| $\angle D$ in $\triangle BDC$ |

Terms:

A. _____

B. _____

C. _____

D. _____

E. _____

F. _____

G. _____

H. _____

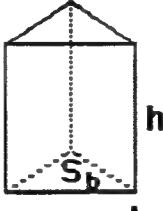
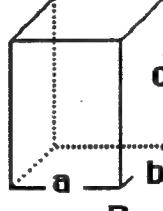
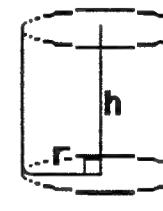
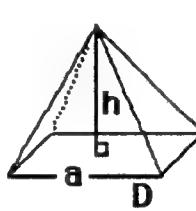
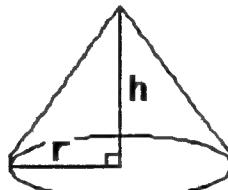
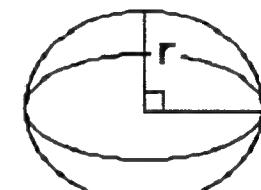
Name _____ Date _____

Activity #7

Solid Figures

Complete this activity using the Data Retrieval Utility. Select Solid Figures from the Topics Menu and study the terms represented in this diagram. In the spaces below write the names of the 6 geometric terms represented in this diagram. Label the diagram by placing the corresponding letter on the figure in the diagram.

Solid Figures

| | |
|-----------------------------|--|
| $V = h S_b$ |  |
| $V = abc$ |  |
| $V = \pi r^2 h$ |  |
| $V = \frac{a^2}{3} h$ |  |
| $V = \frac{1}{3} \pi r^2 h$ |  |
| $V = \frac{4}{3} \pi r^3$ |  |

Terms:

A. _____

B. _____

C. _____

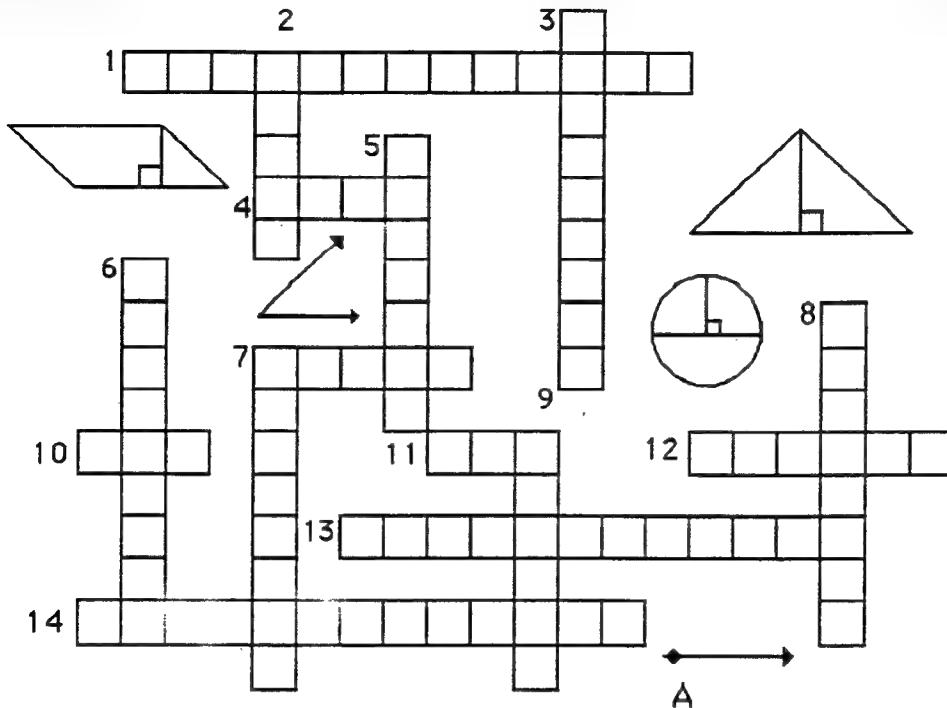
D. _____

E. _____

F. _____

Activity #8**Crossword Puzzle**

Use the Data Retrieval Utility to study the terms associated with the Basic Concepts diagram. Use this crossword puzzle activity to review the terms.

**Cross**

1. A geometric figure with two pairs of parallel sides.
4. The name for a set of points that extend infinitely in opposite directions.
7. A position.
10. The set of points extending infinitely in one direction.
11. A part of a circle.
12. A figure with four sides that are equal and four right angles.
13. Lines which cross at a single point.
14. Lines which form a right angle.

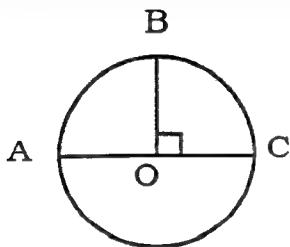
Down

2. Two rays extending from the same point.
3. A figure with two parallel sides and two sides that are not parallel.
5. A part of a line.
6. A parallelogram with right angles.
7. Lines in which all corresponding points are the same distance apart.
8. A three sided figure.
9. All the points that are a given distance from a given point and in a plane.

Activity #9**Practice with Angles and Arcs**

Answer these questions after you have completed the unit on circles. Remember that the length of the radius of a circle is one half the length of the diameter. Remember also that a circle is 360°.

Given: $\overline{AC} = 100 \text{ cm}$



Find the length of these line segments and the measurements of these arcs.

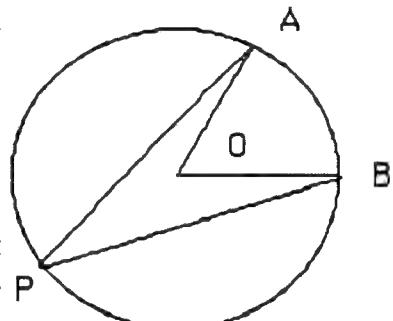
| | |
|-----------------|--|
| \overline{OB} | |
| \overline{OC} | |
| $m\widehat{BC}$ | |
| $m\widehat{AC}$ | |

The arc created by a central angle is equal to the measure of the angle. The measurement of an inscribed angle is one-half the measurement of the arc.

Given: O is the center of each circle.

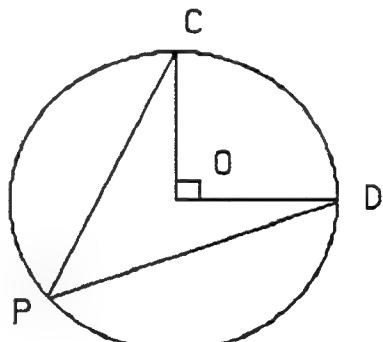
$$m\angle AOB = 50^\circ$$

$$\overline{OC} \perp \overline{OD}$$



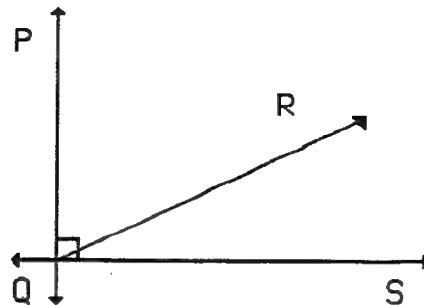
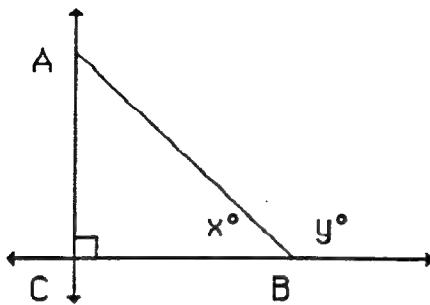
Find the measure of these angles and arcs.

| | |
|------------------|--|
| $m\angle APB$ | |
| $m\widehat{AB}$ | |
| $m\widehat{APB}$ | |
| $m\angle CPD$ | |



Activity #10**Angles with Special Relationships**

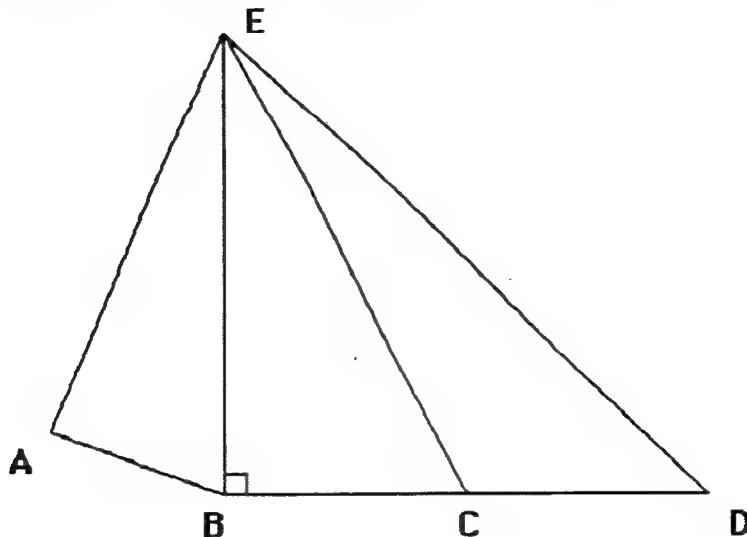
Answer these questions after you have completed the unit on Triangles and Angles.



1. If $x=55$, then what is y ?
2. If $y=132$, then what is x ?
3. If $x=60$ and the sum of all angles in a triangle is 180 , what is the measurement of angle BAC ?
4. What is the measurement of y if x is 57° ?
5. What is the sum of x and y ?
6. If x increases by 10 what happens to the measurement of y ?
7. If y and x are equal then what is the value of each?
8. What is the sum of angle PQR and RQS ?
9. If angle PQR measures 40° , then what is the measurement of angle RQS ?
10. If the measurement of angle PQR equals the measurement of angle RQS , then what is the value of each?

Activity #11**Classifying Triangles**

Use the figure shown below to identify the triangle given in each exercise. Write the words right triangle, acute triangle or obtuse triangle in the space next to the notation for each triangle.



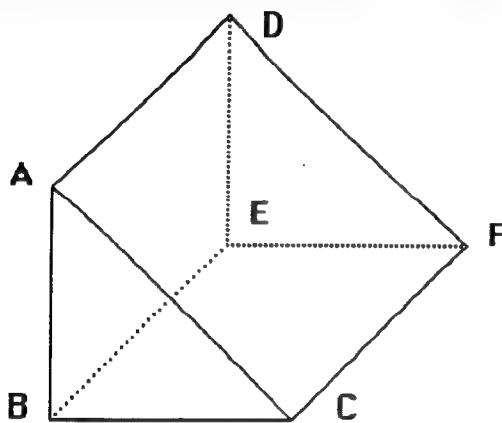
| | |
|-----------------|--|
| $\triangle ABE$ | |
| $\triangle BCE$ | |
| $\triangle CDE$ | |
| $\triangle BDE$ | |

In the box below make a sketch of each type of triangle. Mark an "A" on all the angles which are acute angles, mark an "R" on all the angles which are right angles and mark an "O" on all the obtuse angles in each triangle.

| Acute Triangle | Right Triangle | Obtuse Triangle |
|----------------|----------------|-----------------|
| | | |

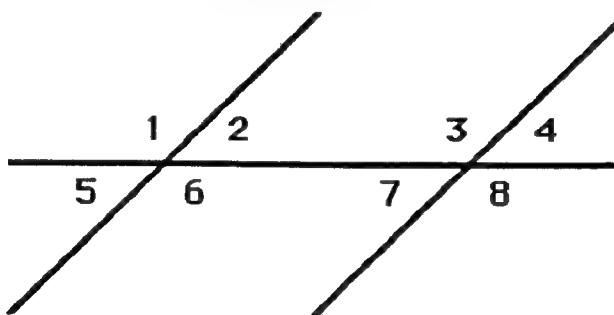
Activity #12**Lines and Planes**

The figure shown below shows a triangular prism. It is a three dimensional object with three rectangular sides and two triangular bases. Use the words perpendicular, parallel and skew to describe the relationship between each pair of lines given in the chart.



| | | |
|-----------------|-----------------|--|
| \overline{AB} | \overline{DE} | |
| \overline{AC} | \overline{DE} | |
| \overline{DE} | \overline{EF} | |
| \overline{AC} | \overline{DF} | |
| \overline{EF} | \overline{AB} | |

When a pair of parallel lines are intersected by a transversal eight angles are formed. The angles have special relationships. Draw a line from the pair of angles to the name of the relationship.

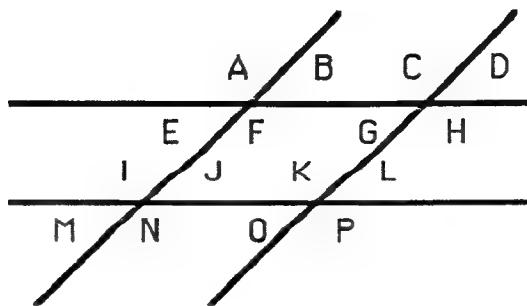


- $\angle 1$ and $\angle 2$
- $\angle 1$ and $\angle 6$
- $\angle 2$ and $\angle 7$
- $\angle 5$ and $\angle 4$
- $\angle 2$ and $\angle 4$

- corresponding
- alternate exterior
- supplementary
- vertical
- alternate interior

Name _____ Date _____

The figure below shows two pairs of parallel lines that intersect. Determine the measurement of the angles based on the information given. Write the reason in the space to the right.



| If $m\angle A$ is 135° , then | Reasons |
|--------------------------------------|---------|
| $m\angle B =$ | |
| $m\angle C =$ | |
| $m\angle H =$ | |
| If $m\angle J$ is 60° , then | Reasons |
| $m\angle O =$ | |
| $m\angle I =$ | |
| $m\angle L =$ | |

Answer these questions and explain your reasoning.

1. Name any eight pairs of supplementary angles in the diagram shown above.
2. Name any four pairs of vertical angles.
3. Name any four pairs of corresponding angles.

Activity #13**Area and Perimeter Problems**

Complete this chart using the formula for finding the area of a rectangle.



$$\text{Area} = \text{base} \times \text{height}$$

$$A = bh$$

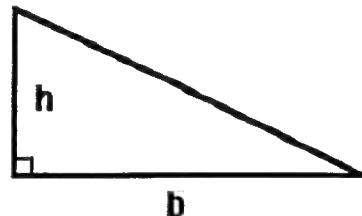
$$\text{Perimeter} = 2(\text{base} + \text{height})$$

$$P = 2(b+h)$$

| | Area | Perimeter | base | height |
|---|--------------------|------------------|-------------|---------------|
| 1 | | | 5cm | 9cm |
| 2 | | | 8cm | 7cm |
| 3 | 60cm ² | | 10cm | |
| 4 | | 100cm | | 30cm |
| 5 | 130cm ² | | 10cm | |
| 6 | | | 20cm | 30cm |

Practice finding the area of a triangle by completing this table.

| | Area | base | height |
|----|--------------------|-------------|---------------|
| 7 | | 8cm | 4cm |
| 8 | | 12cm | 3cm |
| 9 | 30cm ² | 10cm | |
| 10 | 50 cm ² | | 5cm |
| 11 | 60cm ² | 10cm | |
| 12 | | 15cm | 30cm |



$$\text{Area} = \frac{1}{2} \times \text{base} \times \text{height}$$

$$A = \frac{1}{2} bh \quad \text{or} \quad A = \frac{bh}{2}$$

13. What is the area of a rectangle with a base of 3 meters and a height of 1.5 meters? What is the perimeter for the same rectangle?
14. The area of a triangle is 36 m² and the base of the triangle is 8 meters. What is the height?
15. Find the area of a rectangle with a base of 12cm and a height of 6cm. What is the area of a triangle with the same dimensions?

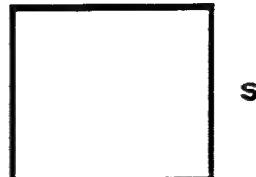
Name _____ Date _____

Activity #13 (continued)

Area and Perimeter Problems

Practice using the formula for finding the area of a square by completing this chart.

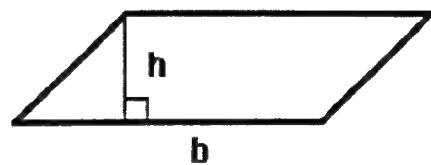
| | Area | side |
|----|--------------------|-------------|
| 16 | | 9cm |
| 17 | | 13cm |
| 18 | 100cm ² | 10cm |
| 19 | | 5cm |
| 20 | 81cm ² | |
| 21 | | 15cm |



$$\text{Area} = \text{side} \times \text{side}$$

$$A=s^2$$

| | Area | base | height |
|----|--------------------|-------------|---------------|
| 22 | | 4cm | 12cm |
| 23 | | 12cm | 8cm |
| 24 | 40cm ² | | 10cm |
| 25 | 50 cm ² | 5cm | |
| 26 | 60cm ² | 15cm | |
| 27 | | 20cm | 30cm |



$$\text{Area} = \text{base} \times \text{height}$$

$$A = bh$$

Special Challenge

How many square 12 inch tiles are needed to cover a courtyard that is 5 yards by 7 yards?

Name _____ Date _____

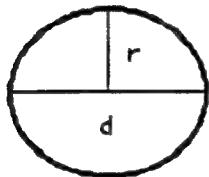
Activity #13 (continued)

Area and Circumference Problems

Practice working with the formulas for the area and circumference of a circle by completing this chart. Use 3.14 or $\frac{22}{7}$ as the value for pi.

| Area | Circumference | radius | diameter |
|------|---------------|--------|----------|
| 28 | | 4cm | |
| 29 | | 5cm | |
| 30 | | | 7cm |
| 31 | | 7cm | |
| 32 | | | 8cm |
| 33 | | 10cm | |

$$\text{Circumference} = \pi \times \text{diameter}$$



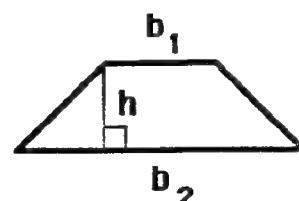
$$C = \pi d$$

$$\text{Area} = \pi \times \text{radius}^2$$

$$A = \pi r^2$$

A trapezoid is a figure with two parallel sides and two non-parallel sides. The height is the distance between the parallel sides. Use the formula given below to find the area of the trapezoids described in the table.

| Area | base ₁ | base ₂ | height |
|------|-------------------|-------------------|--------|
| 34 | 3cm | 8cm | 4cm |
| 35 | 10cm | 12cm | 3cm |
| 36 | 10cm | 15cm | 10cm |
| 37 | 6cm | 8cm | 5cm |
| 38 | 10cm | 12cm | 6cm |
| 39 | 15cm | 18cm | 30cm |
| 40 | 15cm | 20cm | 30cm |



$$A = \text{height} \left(\frac{\text{base}_1 + \text{base}_2}{2} \right)$$

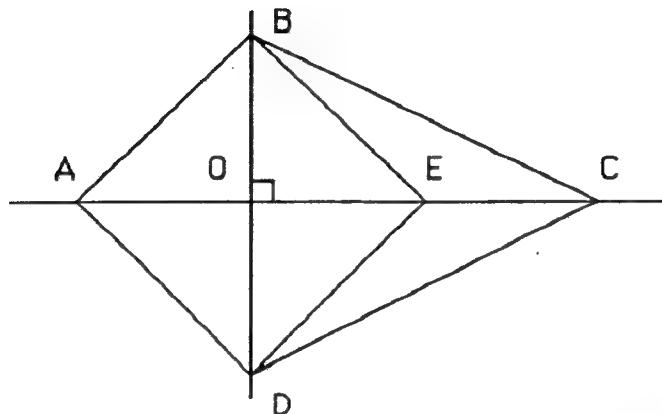
$$A = h \left(\frac{b_1 + b_2}{2} \right)$$

Name _____ Date _____

Activity #14

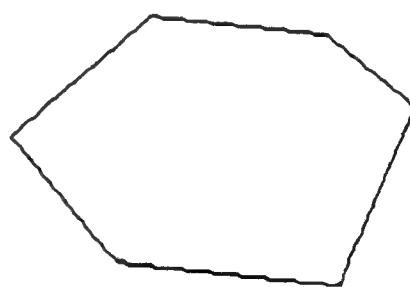
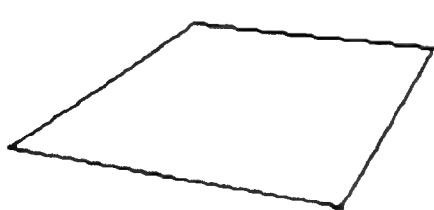
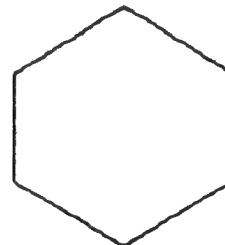
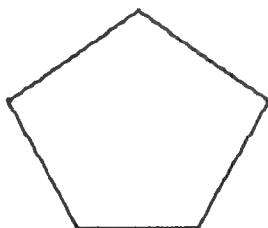
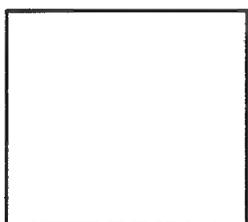
Hypotenuses and Diagonals

Complete the chart shown below by naming the hypotenuse for each triangle given.



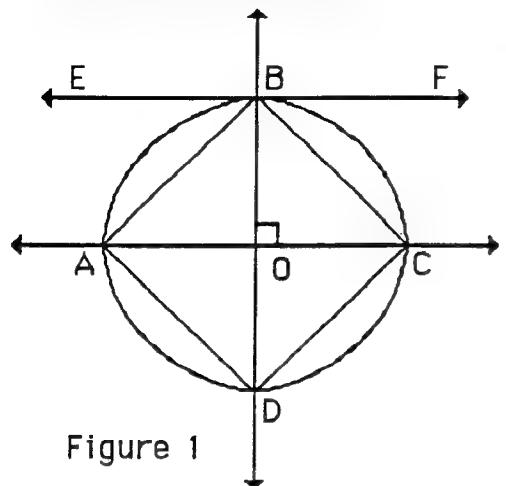
| | hypotenuse |
|-----------------|-------------------|
| $\triangle AOB$ | |
| $\triangle BOE$ | |
| $\triangle BOC$ | |
| $\triangle DOE$ | |
| $\triangle DOC$ | |
| $\triangle DOA$ | |

Use a ruler to draw all the possible diagonals for each of these figures.



Activity #15**Review of Terms**

Draw lines to connect a line or line segment given in the bubbles on the left to a phrase in the bubbles on the right.



- | | |
|---------------------------|-------------------------------|
| \overline{CD} | tangent to circle O |
| \overline{BC} | diameter in circle O |
| \overline{OC} | hypotenuse in $\triangle BOC$ |
| \overleftrightarrow{EF} | chord in circle O |
| \overline{AC} | base in $\triangle BOC$ |
| \overline{OA} | radius in circle O |

Write the name of the term for each part of Figure 1 given below:

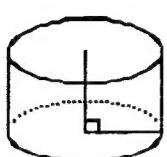
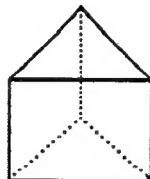
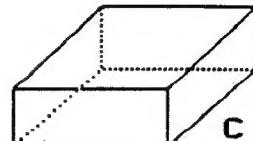
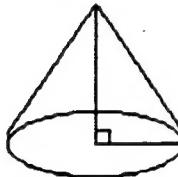
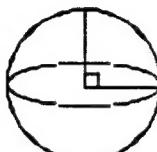
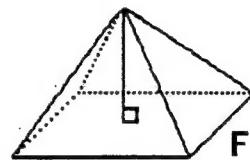
| | |
|------------------------------------|------------------------------|
| \overline{OB} in $\triangle BOC$ | \overline{OC} in $\odot O$ |
| \overline{OC} in $\triangle BOC$ | \overline{AC} in $\odot O$ |
| \overline{BD} in $\square ABCD$ | \overline{CD} in $\odot O$ |

Use Figure 1 and what is given on the left side of the table to find the answers to the problems presented in the table on the right side.

| Given | Find |
|---|------------------------|
| $m \overline{OC} = 3.5 \text{ cm}$ | $m \overline{AC}$ |
| $m \overline{BC} = 5 \text{ cm}$ | Area of $\square ABCD$ |
| $\overline{EF} \parallel \overline{AC}$ | Area of $\odot O$ |
| | $m \angle OBF$ |

Activity #16**Solid Figures**

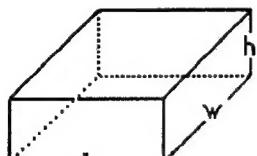
Write the letter of the correct figure in the box next to its name.

**A****B****C****D****E****F**

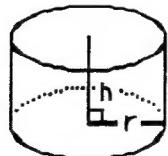
circular cylinder**rectangular solid****regular prism**

sphere**pyramid****circular cone**

Write the formula for finding the volume in the space below the figure.
Complete the table by finding the volume.



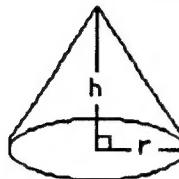
| length | width | height | volume |
|---------------|--------------|---------------|---------------|
| 5cm | 10cm | 3cm | |
| 4cm | 16cm | 10cm | |
| 13cm | 8cm | 10cm | |

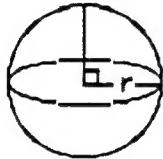


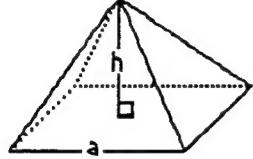
| radius | height | volume |
|---------------|---------------|---------------|
| 5cm | 10cm | |
| 4cm | 16cm | |
| 13cm | 8cm | |

Activity #16 (continued)**Solid Figures**

Write the formula for finding the volume in the space below the figure. Complete the table by finding the volume.

| | | | |
|---|---------------|---------------|---------------|
|  | radius | height | volume |
| | 15cm | 10cm | |
| | 30cm | 16cm | |
| | 13cm | 12cm | |

| | | |
|---|---------------|---------------|
|  | radius | volume |
| | 12cm | |
| | 21cm | |
| | 9cm | |

| | | | |
|---|---------------|---------------|---------------|
|  | side a | height | volume |
| | 18cm | 8cm | |
| | 6cm | 9cm | |
| | 3cm | 10cm | |

1. A large rectangular storage tank is 20 meters long, 10 meters wide and 10 meters deep. What is the capacity of the tank?
2. Calculate the volume of a pyramid 2.5 meters high, with a square base that has a length of 3 meters.
3. A cylindrical jar is 10 cm tall. The diameter of the jar is 8 cm. What is the volume?

Answers to Activity Pages

Activity #1

- A. point
- B. ray
- C. line segment
- D. line
- E. angle
- F. arc
- G. parallel lines
- H. perpendicular lines
- I. intersecting lines
- J. circle
- K. triangle
- L. rectangle
- M. square
- N. parallelogram
- O. trapezoid

Activity #2

- A. inscribed angle
- B. central angle
- C. radius
- D. tangent
- E. chord
- F. major arc
- G. minor arc
- H. secant
- I. right angle
- J. diameter

Activity #3

- A. right angle
- B. vertical angles
- C. supplementary angles
- D. right angles
- E. obtuse triangle
- F. acute triangle
- G. hypotenuse

Activity #4

- A. intersection
- B. transversal
- C. skew lines
- D. parallel lines
- E. perpendicular lines
- F. diagonal line
- G. alternate interior
- H. alternate exterior
- I. corresponding angles
- J. vertical angles
- K. supplementary angles
- L. adjacent angles

Activity #5

- A. area of triangle
- B. area of a square
- C. circumference
- D. perimeter of rectangle
- E. area of circle
- F. area of trapezoid
- G. area of rectangle

Activity #6

- A. hypotenuse
- B. diagonal
- C. diameter
- D. radius
- E. altitude
- F. base
- G. side
- H. right angle

Activity #7

- A. regular prism
- B. rectangular solid
- C. circular cylinder
- D. pyramid
- E. circular cone
- F. sphere

Activity #8

Across

- 1. parallelogram
- 4. line
- 7. point
- 10. ray
- 11. arc
- 12. square
- 13. intersecting
- 14. perpendicular

Down

- 2. angle
- 3. trapezoid
- 5. segment
- 6. rectangle
- 7. parallel
- 8. triangle
- 9. circle

